In the Drawings

Add the attached replacement sheet with Fig. 5 to the drawings of this application.

REMARKS

By the present Amendment, claims 1-10 are cancelled, and claims 11-25 are added. This leaves claims 11-25 pending in the application, with claim 11 being independent.

Claims 11-15, 17 and 19-25 are generic to both species and read on the elected embodiment of Figs. 1-2. Claims 16 and 18 read on the embodiment of Figs. 3-4.

Drawing Objection

The drawings are objected to under 37 C.F.R. §1.83(a) for allegedly failing to adequately illustrate plural tensioning means, as recited in original claim 3. Since the drawings are partial and elevational views, they are graphical representations of plural tensioning means or set screws. Additionally, added Fig. 5 is a graphical and partial end view with multiple tensioning means or screws illustrated more clearly.

Thus, the application complies with 37 C.F.R. §1.83.

Substitute Specification

The specification is revised to eliminate grammatical and idiomatic errors in the originally presented specification. The number and nature of the changes made in the specification would render it difficult to consider the case and to arrange the papers for printing or copying. Thus, the substitute specification will facilitate processing of the application. The substitute specification includes no "new matter". Pursuant to M.P.E.P. § 608.01(q), voluntarily filed, substitute specifications under these circumstances should normally be accepted. A marked-up copy of the original specification is appended hereto.

Claim Objections

Original claims 1, 4 and 9 are objected to as being informal. By the present Amendment, the originally filed claims have been rewritten to avoid the language alleged to be informal in the Office Action. All language of the presently pending claims is now believed to be formal and definite.

Thus, the pending claims are formal and comply with 35 U.S.C. § 112.

Rejection Under 35 U.S.C. §§102 and 103

Claim 11 covers a threaded ring for threadedly engaging an externally threaded section 18 of a spindle comprising a one-piece body and an actuator 34. The one-piece body has first and second body components 10 and 12 relatively movable between a preinstallation state (Fig. 1) and an installation state (Fig. 2) and has a longitudinal axis. Each body component has an internal thread 14, 16 forming a threaded flank clearance in the preinstallation state. The first body component 10 forms a set collar with a planar surface 22 on one end extending in a radial plane relative to the longitudinal axis. The second body component 12 forms a retaining ring connected to the first body component, and has a contact surface 46 extending non-perpendicularly relative to the longitudinal axis and at an angle of inclination from a plane perpendicular to the longitudinal axis in the preinstallation state. The threaded flank clearance is eliminated in the installation state. A gap 28 is between the body components. An elastically flexible wall component 32 of the body connects the first and second body components. Then actuator engages the contact surface 46 to adjust geometry of the gap by adjustment of the flexible wall along the longitudinal axis and by movement of the body components between the preinstallation and installation states.

By forming the threaded ring in this manner, the non-perpendicular, angular orientation of the contact surface relative to the longitudinal axis and the engagement of the actuator with that non-perpendicular, angular contact surface eliminate the flank clearance in an efficient manner by compensating for the tilting of the second body component 12 relative to the first body component 10 when moving from its preinstallation state to its installation state. Such contact surface, that is engaged by the actuator and being non-perpendicular and angularly oriented, is not disclosed or rendered obvious by any of the cited patent publications, particularly the Gall patent.

Original claims 1-2 and 9-10 stand rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 2,409,204 to Gall. The Gall patent is cited as disclosing a threaded ring with internal threading and two body components 15 and 16. The first body component 15 allegedly forms a set collar with an end plane surface, while the second body 16 allegedly forms a retaining ring connected to the first body by an elastically flexible wall component 17 and forming a gap between the two body components. An actuating mechanism 23 allegedly adjusts the gap geometry by flexing wall component 17. Screw 19 allegedly provides the actuating mechanism. The contact surface on body component 16 is allegedly provided with a definable inclination relative to the body longitudinal axis, which inclination is under the head of the screw 19, as allegedly illustrated in the left hand side of Fig. 2. This inclination allegedly eliminates the flank clearance.

Original claims 3-5 stand rejected under 35 U.S.C. §103 as being unpatentable over the Gall patent. Use of plural tensioning means is alleged to be obvious based on the Examiner taking official notice. The location of the inclined contact surface of claim 4 and the assigning of the contact to each tensioning means of claim 5 is allegedly disclosed in the Gall patent.

The Gall patent discloses a shaft locking device mounted partially on a shaft housing 7. The locking device 12 has two end portions 15 and 16 joined by an intermediate side portion 17 with a slot or recess 14 between the end portions. A single screw 19 extends parallel to the longitudinal axis of the locking device 12 and is threadedly engaged with end member 15. The tightening of the screw causes the end member 16 to pivot toward end member 15 about an axis corresponding substantially to the base of slot 14. Only end member 15 has internal threads to engage the portion 10 of the externally threaded shaft housing 7. No threads are provided on the end member 16.

In the position illustrated in Fig. 2 of the Gall patent, the lateral, outer configuration of the Gall shaft locking device 12 appears to have a hexagonal shape. As illustrated in Fig. 2, the outer, top surface of end member 16 is planar and has a circular shape with aperture 13 in its middle. The corners of the hexagonal side surfaces of end member 16 merge into its planar, top circularly shaped surface by a series of curved bevel surfaces. The circular planar surface is perpendicular to the longitudinal axis of the Gall locking device passing through aperture 13. The head of screw 19 only engages the planar circular top surface of end member 16, and is not shown to be or disclosed to be in engagement with the adjacent curved bevel surface in either the locked or unlocked state of the Gall locking device.

In rejecting the originally filed claims, the bevel surface, appearing to the left of screw 19 in Fig. 2, is apparently relied upon as a contact surface extending at an angle of inclination. However, claim 11 is patentably distinguishable over the Gall patent, particularly as interpreted in the Office Action, by a contact surface extending non-perpendicularly to and at an angle of inclination to a plane perpendicular to the longitudinal axis in the preinstallation state where such

contact surface is engaged by the actuator. Even if that bevel surface of the Gall locking device is interpreted as forming an angled surface, it does not engage the actuator, as claimed.

Additionally, claim 11 is patentably distinguishable over the Gall patent by the threads on both body parts. The Gall patent, with its end members alleged to correspond to the claimed first and second body components, does not have internal threads on its end member 16. Nothing in the Gall patent suggests or provides a reason for adding any such threads on that member. Adding threads on that member would also render the Gall device inoperative for its intended purpose, since such added threads would prevent operation of potentiometer 5 by rotating its shaft 8.

Accordingly, claim 11 is not anticipated or rendered obvious by the Gall patent. None of the other cited patents cure these deficiencies in the Gall patent.

Claims 12-25, being dependent upon claim 11, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patents.

Claim 12 is further distinguishable by the contact surface extending perpendicular to the longitudinal axis in the installation state. The bevel surface of the Gall patent is not shown to be perpendicular to the longitudinal axis in any of its operational positions.

Claim 13 is further distinguishable by the use of plural tensioners. Relative to this feature, the Gall patent admittedly fails to disclose this feature. Although Official Notice is taken, no evidence is provided to support such official notice. Such taking of Official Notice is challenged and evidence is requested to support the basis therefor. M.P.E.P. §2144.03C.

Claim 14 is further distinguishable by the contact surface being situated between the tensioners and the second body component, within the overall claimed combination.

Claim 15 is further distinguishable by part of the contact surface being assigned to each of the tensioners. Since no plural tensioners are disclosed in the Gall patent, it cannot disclose or render this feature obvious.

Claim 16 is further distinguishable by the claimed recesses. Such feature has not yet been treated on its merits.

Claim 17 is further distinguishable by plural set screws with heads supported on the contact surface in the installation state. As noted above, the head of the screw 19 in the Gall patent is not shown to be supported on the bevel surface relied upon as the contact surface.

Claim 18 is further distinguishable by the hexagonal head screws countersunk in recesses, as well as the external from face being at a clamping angle, which features have not been addressed in the Office Action.

Claim 19 is further distinguishable by the body components having equal outside diameters, within the overall claimed combination.

Claim 20 is further distinguishable by the inclination being one-half to five degrees. No such angle of inclination is disclosed for the bevel surfaces.

Claim 21 is further distinguishable by the angle of inclination is one to three degrees. Again, no such angle dimensions are disclosed or rendered obvious by the Gall patent.

Claim 22 is further distinguishable by the angular orientation of the head surface and the contact surface in the preinstallation state. No such angular orientation is disclosed or rendered obvious by the Gall patent, since the bevel surface does not form a contact surface for engaging its screw 19.

Claim 23 is further distinguishable by the smaller angle between the head surface and the contact surface in the installation state relative to the preinstallation state. Such difference in the angles is not disclosed or rendered obvious by the Gall patent.

Claim 24 is further distinguishable by the angle of inclination being an acute angle, within the overall claimed combination.

Claim 25 is further distinguishable by the contact surface being a planar surface. As noted above, the Gall bevel surface is curved, not planar, as claimed.

In view of the foregoing, claims 11-25 are allowable. Prompt and favorable action is solicited.

Respectfully submitted,

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[continued on next page]

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Patent Application

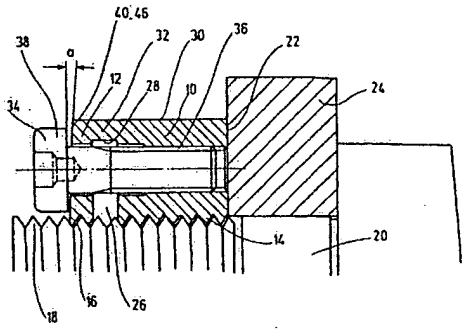
of

HEINZ METZGER

for

THREADED RING

WO 2005/073570 A1



(57) **Abstract:** The invention relates to a threaded ring having a single-component body provided with an internal screw thread (14, 16) and consisting of two body parts (10, 12). The first part thereof (10) forms an adjusting ring having an end face (22) which is located on a radial plane, and the second body part thereof (12) forms a security ring which is connected to the first body part (10) by means of an elastically flexible wall part (32) of the body, forming a gap (26) between the two body parts (10, 12) and comprises an actuating device by means of which the geometry of the gap (26) can be adjusted due to the elastic flexibility of the wall element (29) along the longitudinal axis of the body. A bearing surface (46) comprising a predefinable inclination is arranged in the premounting state between parts of the actuating device and parts of the body and the inclination angle (a) in relation to the longitudinal axis of the body is selected in such a manner that in the mounting state, play occurring on the flanks of the screw thread is eliminated, enabling a high degree of efficiency to be obtained based on the force of the actuating device exerted on the inclined bearing surface and the thread flanks which are to be clamped.

(57) **Zusammenfassung:** Die Erfindung betrifft einen Gewindering, dessen mit einem Innengewinde (14, 16) versehener, einstückiger Körper mindestens zwei Körperteile (10, 12) aufweist, deren erster (10) einen Stellring mit einer endseitigen, in einer Radialebene liegenden Planfläche (22) bildet und deren zweiter Körperteil (12) einen Sicherungsring bildet, der mit dem ersten Körperteil

[Fortsetzung auf der nächsten Seite]

Field of the Invention

NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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Reference is made for an explanation of the two-letter codes and the other abbreviations to the Guidance Notes on Codes and Abbreviations in the front section of each regular PCT Gazette edition.

~~Threaded Ring~~

The present invention relates to a threaded ring ~~the~~ having a one-piece body ~~of which~~ provided with internal threading ~~has~~and at least two body components~~, the~~. The first ~~of which~~ body component is in the form of a set collar with an end plane surface in a radial plane~~, and the~~. The second body component ~~of which~~ forms a retaining ring ~~which is~~ connected to the first body component to form a gap positioned between the two body components by ~~way of~~ an elastically flexible wall component of the body ~~and has an~~. An actuating mechanism ~~by means of which~~ adjusts the geometry of the gap ~~can be adjusted on the basis of~~ due to the elastic flexibility of the wall component along the longitudinal axis of the body.

Background of the Invention

Threaded rings of this type~~, which have been~~ are disclosed in DE Patent Application 1 675 685, ~~-~~for example, are commercially available and are applied in various areas of mechanical engineering. The body component forming the plane surface serves as a high-precision nut seated on the external threading of a shaft or spindle~~, a~~. The nut ~~the~~ axial position ~~of which~~ along the longitudinal axis of the threaded ring can be determined with high accuracy by ~~means of~~ the second body component ~~which is~~ used as the retaining ring~~, the~~. The threaded flank clearance present between external threading and internal threading ~~being~~ is eliminated in that the width of the gap between the two body components is modified ~~accordingly~~ by the actuating mechanism~~, such~~.

Such modification ~~beingis~~ made possible by the elastic flexibility of the wall component ~~which forms~~ forming the body components.

The actuating mechanism can be set screws ~~which permit~~permitting reciprocal tightening of the set collar and the retaining ring. The set collar may function as an adjusting nut with a plane surface ~~which forms~~forming a contact surface for positioning of roller bearings on shafts, or can be used as a precisely positioned shaft collar or the like.

In the ~~instances of the disclosed~~ described threaded ring ~~described in the foregoing~~, the gap between the body components is formed by two gap segments offset from each other in the axial direction~~, one of which~~. One segment extends from the threaded bore to the vicinity of the circumference of the threaded ring~~, and the~~. The other segment extends radially inward from the circumferential surface to the vicinity of the threaded bore . Between the two gap segments ~~there is~~, an elastically flexible wall component ~~which~~ connects the two body components and ~~which~~ has a wall thickness ~~which is~~ selected ~~in~~ such ~~a way~~ that this wall component is elastically flexible ~~such that the~~. The geometry of the gap may then be adjusted by the set screws serving as an actuating mechanism ~~so that the~~. The threaded flank clearance is eliminated ~~and the~~. The locking effect desired is achieved by tensioning the two body components. The relatively high production cost is a disadvantage of ~~the disclosed~~ this threaded ring.

EP 0 956 768 A1 discloses another generic threaded ring ~~which is~~ made as a precision tensioning nut. ~~The disclosed~~ This precision tensioning nut has a solid nut block having an internal threading, an end face ~~which has been~~ machined flat and ~~which is~~ aligned at a right angle to the axis of the thread, and a circumferential surface. Individual clamping elements each form a radially extending segmented sector from a part of the nut block. The clamping elements ~~in the disclosed solution~~, for the purpose of axial locking by ~~means of~~ a clamping screw ~~which may be operated~~operable parallel with the axis, may be elastically inclined. The clamping elements moreover form at most 50% of the ~~indicated~~ component such that in axial locking on the tensioning side at most 50% of the circumference of the thread in the form originally produced ~~are~~ is changed. Distortion of the plane surface and loosening by insufficient locking are thus avoided. This ~~disclosed~~ solution compared to the initially mentioned solution in the prior art has only one open gap segment and not two~~, which~~. The gap segment is ~~moreover~~ also closed to the outside so that no

foreign substances are able to penetrate from the outside into the gap area ~~and the~~. The production effort and the costs are thus reduced accordingly~~; only~~. Only the production of the segmented clamping element is in turn associated with increased production effort~~, and achieving~~. Achieving a uniform application of the clamping force is likewise made difficult as a result of the segmented configuration of the clamping elements.

DE-A-102 52 780 A1 (corresponding to U.S. Patent No. 7,182,564) discloses another ~~generic~~ threaded ring~~, the~~. A second body component used as the retaining ring ~~to form the~~ forms an elastically flexible wall component having a circumferential area which, compared to the first body component, is reduced to an outside diameter ~~which clearly is~~ situated over a smaller radius than the end of the gap ~~which is~~ situated radially to the outside~~, and the~~. The circumferential area of the second body component which has been reduced in diameter ~~ending~~ends at an axial distance from the gap ~~which defines~~defining the extension of the flexible wall component in the axial direction.

Instead of the complex production of two gap sections, in this disclosed solution with the formation of the flexible wall component, only the configuration of an integral gap as an internal recess and the external machining of the second body component are necessary ~~in order~~ to reduce its outside diameter in areas~~; this~~. This reduction can be effected by simple machining.

Furthermore, in the disclosed solutions ~~there may be instances where~~, after fixing the set collar on the assignable threaded piece and after subsequent tightening of the retaining ring, plastic deformations may unintentionally occur along the threadings ~~in question; this~~. This deformation leads to the threaded ring becoming unusable ~~and the~~. The threaded ring then possibly can no longer be removed from the clamping thread. Basically ~~it is possible to prevent~~, this problem ~~by way of~~ can be prevented by torque wrenches with a definable locking torque~~; in~~. In practical applications for the threaded ring, however, often in the absence of a suitable torque wrench, this measure is ignored and the threaded ring is fixed with conventional tools.

On the basis of this latter prior art, the

Summary of the Invention

An object of the present invention is to further improve the disclosedprovide an improved threaded ring solution while maintaining its the advantages, specifically its being of the conventional threaded rings, that is simple and economical to produce, so that at a reduced size high efficiency can still be achieved, i.e., that by. By tensioning the two body components, the threaded flank clearance is effectively eliminated to achieve the desired locking action.

This object is basically achieved by a threaded ring with the configuration of features claimed in claim 1.

In that, as specified in the characterizing part of claim 1, in the having a preinstallation state there is where a contact surface is between the components of the actuating mechanism and the components of the body which. The contact surface is provided with a definable inclination and because the. The angle of inclination relative to the longitudinal axis of the body is selected such that in the installed state the occurrence of threaded flank clearance is eliminated, in. In the installed state, the clamping force of the actuating mechanism then takes effect on the inside circumference near the threaded flanks which are to be clamped so that as. As a result of the favorable distances between the external radial end of the gap, of the application of force of the actuating mechanism by way of the inclined contact surface and of the threaded flanks to be clamped, high efficiency is achieved, that. That is to say, the threaded flank clearance is effectively eliminated to obtain an adequate locking effect. The threaded ring as claimed in theof the present invention can be easily and economically produced, and requires only little installation space since on the one hand there need not be two gap segments, but only one, and furthermore since making the two body components different with respect to their circumferential area can also be omitted.

An additional advantage is that there is no gap segment open to the outside on the threaded ring; the. The threaded ring as claimed in the of the present invention therefore has a closed

circumferential contour so that this also avoidsto avoid the danger that during operation of foreign substances can settlesettling in the gap area which otherwise is open on. Such would occur if the circumference, for is open. For example, contaminants, wear particles, shavings or the like, which are contained in the lubricants and which, could lead to the formation of an unbalancing mass on the circumference of the threaded ring. Based on the sleeve-like configuration moreover, uniform application of force with the threaded ring is achieved, as is thus a high level of locking of the threaded ring at the installation site.—

The claimed inclined positioning of the retaining ring before the defined fixing position of the threaded ring on the assignable respective thread moreover ensures that the set collar can be fixed in a defined manner and when. When the retaining ring is subsequently tightened, only the assignable threaded flank clearance is overcome before the application of the locking force by way of the retaining ring to the set collar takes place. As a result of this measure it has been found that in this way, plastic deformations in the clamping process between the threads can for the most part be prevented so that even. Even in an improper clamping process, the threaded ring then maintains its function and can also be easily removed again from the assigned respective thread.

In one preferred embodiment of the threaded ring as claimed in theof the present invention provision is made such that, the actuating mechanism has tensioning means which, to the extent they are countersunk into assignablerespective recesses of the retaining ring in the installed state, form with their tightening contact surfaces to the front face of the retaining ring a clamping angle which correspondscorresponding to the angle of inclination in the preinstallation state. This arrangement yields the possibility of visual checking for a successfully completed clamping process using the indicated clamping angle.

Other advantageous embodiments are the subject matter of the other dependent claims.

The threaded ring as claimed in theobjects, advantages and salient features of the present

invention ~~is~~will become apparent from the following detailed ~~below using two exemplary embodiments as shown in the~~description, which, taken in conjunction with the annexed drawings, ~~in which in schematic form and not drawn to scale~~discloses preferred embodiments of the present invention.

Brief Description of the Drawings

Referring to the drawings which form a part of this disclosure and which are schematic and not to scale:

FIG. 1 ~~shows~~is a ~~longitudinal~~ partial, side elevational view in section of ~~only~~ one-half side of ~~the~~a threaded ring according to a first exemplary embodiment of the ~~threaded ring claimed in the~~ present invention, on a threaded spindle, with the illustration being simplified for the sake of greater clarity of presentation of the ~~diagram~~principle of operation and in particular the threaded flank clearance being shown enlarged and the threaded ring being shown in the unlocked state, as it corresponds to the preinstallation or preinstalled state;

FIG. 2 is a partial, side elevational view in section of the threaded ring of FIG. 1, with the screw-on threaded ring being shown in the locked state, that is in the installation or installed state;

FIG. 3 is a partial, side elevational view in section of one side of a thread ring according to a second exemplary embodiment of the present invention, on a threaded spindle, with the illustration being simplified for the sake of greater clarity of presentation of the principle of operation and in particular the threaded flank clearance being shown enlarged and the threaded ring being shown in the unlocked state, as it corresponds to the preinstallation state;

FIG. ~~2 shows a representation which corresponds to FIG. 1, however~~4 is a partial, side elevational view in section of the threaded ring of FIG. 3, with the screw-on threaded ring being shown in the locked state, that is ~~in~~ the installed state; and

~~FIGS. 3 and 4 show a second embodiment analogous to FIGS. 1 and 2.~~ 5 is a partial, end elevational view of the thread ring of FIG. 1 showing plural screws.

Detailed Description of the Invention

The threaded ring shown in the figures has two primary components, specifically a first body component 10 ~~which functions~~functioning as a set collar or adjusting nut and a second body component 12 ~~which forms~~ forming a retaining ring. The two body components 10 and 12 are provided with continuous internal threading or threads 14, 16 respectively~~, in~~. In the illustrated embodiment, the internal threading 14 of the first body component 10 ~~having~~ has more threads than the internal threading 16 of the second body component 12. With these internal threadings 14, 16, the threaded ring can be screwed onto a section of a spindle 20 ~~which is~~ provided with an external threading or thread 18. ~~Furthermore, the~~ The body component 10 has an end plane surface 22 ~~which is~~ used for fixing in position a ring body 24 ~~which is~~ seated on the spindle 20 as a shaft collar.

~~There is between~~ Between the two body components 10 and 12, a gap 26 ~~which in~~extends. In the installed state of the threaded ring, the gap extends in the radial direction from the external threading 18 ~~and its~~. The radially external end 28 of the gap 26 is spaced at a radial distance from the common circumference of the two body components 10, 12. The radially external end 28 of the gap 26 with the common circumference 30 borders a wall component 32 by ~~way of~~ which the first body component 10 and the second body component 12 are integrally joined to one another. The wall thickness of this wall component 32 is selected such that the wall component 32 forms a ~~sort of~~ weak point~~, that is to say,~~ or a flexible wall component~~, which for~~. For a threaded ring ~~which has been~~ produced from a steel material, wall component 32 permits flexible adjustment of the position of the second body component 12 relative to the first body component 10~~, the~~. The corresponding adjustment of the geometry of the gap 26 ~~being~~ is then effected, the gap width being modified locally, for example.

As the actuating mechanism for adjusting the geometry of the gap 26, individual set screws 34 are used as tensioning means and, penetrate the gap 26 parallel with the axis, fit into the threaded bores 36 of the first body component 10, and are supported with their screw heads 38 at the end on the second body component 12 in the installed state (compare FIG. 2). The set screws 34 are uniformly distributed over a graduated circle concentric with the longitudinal axis of the threaded ring, and six. Six set screws (not shown) being are provided, for example. In this exemplary embodiment, the set screws 34 are configured as socket head cap screws with screw heads 38 which act on the free end face 40 of the threaded ring. Instead of the socket head cap screws which are shownillustrated, conventional hexagonal head screws can also be used cost-effectively, since in the illustrated embodiment as shown in FIGS. 1 and 2 the possibility exists of radially tightening the set screws 34 is permitted from the outside, not coming from the front face.

In the second embodiment as shown in FIGS. 3 and 4, conversely the screw heads 38 are held countersunk in the axially widening end segment of the pertinent through bore 42 such that in. In the preinstallation state, the screw heads 38 are essentially flush with the external end face 44 of the second body component 12. The described This widening end segment in the embodiment as shown inof FIGS. 3 and 4 is also accompanied by a lengthened internal threading segment relative to the internal threading 16 of the second body component 12. Otherwise, the two embodiments correspond to one another in terms of their function and action so that the. The details stated in the foregoing with respect to the first embodiment also apply accordingly to the subject matter of the second exemplary embodiment, and for the second embodiment the same reference numbers are hence used for individual components ascorresponding to those in the first embodiment as shown in FIGS. 1 and 2.

FIG. 1 shows the unlocked state, that is, the preinstallation state of the threaded ring, the. The existing threaded flank clearance of the thread engagement between the internal threadings 14 and 16, and external threadings 18 being is shown enlarged for the sake of clarity. As is to be seen, hereshown, the flank surfaces of the internal threading 14, 16 which are situated on the right side in

the drawing are situated at a distance from the flank surfaces of the external threading 18 which are situated on the left side in the drawing.

FIG. 2 shows the locked state~~, that is to say,~~ or the installation state, in which by actuating the actuating mechanism with the individual set screws 34 the second body component 12 is tensioned ~~against~~toward the first body component 10~~ such that for~~. For the second body component 12, the flank surfaces of the internal threading 16 ~~which~~ are situated on the right side are then supported on the flank surfaces of the external threading 18~~, conversely for~~. Conversely, for the first body component 10 the flank surfaces of the internal threading 14 ~~which are~~ situated on the left side are supported on the external threading 18~~ so that the~~. The threaded ring unit formed from the body components 10 and 12~~, which are~~ tightened against each other, is then secured in its entirety.

The threaded ring ~~as claimed in~~of ~~the~~the present invention is designed to be rotationally symmetrical and has no grooves, slots, etc. generating unbalance. The set screws 34 distributed uniformly over a concentric graduated circle in conjunction with the flexible configuration of the wall component 32 yield uniform clamping forces on the threading. These clamping forces ensure intensive contact of the threaded flanks of the internal and external threadings 14, 16 and 18 and accordingly high axial stiffness of the threaded ring over the entire circumference. Any form defect adjustments and surface compressions which may be present may be evened out during installation by increased tensioning of the body components 10 and 12. The plane surface 22 of the first body component 10 used as a set collar or adjusting nut may be aligned by deliberate uniform tensioning of the set screws 34 until complete balance is achieved. If necessary, individual set screws 34 may be additionally tightened to compensate for tension on one side caused by the smallest errors of plane extension of the adjacent components.

In addition to the mutual positioning of gap 26 and the two body components 10, 12, the wall thickness of the elastically flexible wall component 32 is of importance ~~in addition~~ to the ~~further significant~~ configuration of the threaded ring ~~as claimed in~~of the present invention~~,~~

specifically. Specifically, in the preinstallation state between the components of the actuating mechanism in the form of set screws 34 and components of the body of the threaded ring, to provide a contact surface 46 which is provided with a definable inclination a, the. The angle of inclination a being is selected relative to the longitudinal axis of the body such that in the installation state the threaded flank clearance which occursoccurring is completely eliminated, as shown. The indicated This angle of inclination a for reliable use may assume values between one--half to five degrees, but preferably it assumes values between one to three degrees, depending on the equalization to be achieved for the threaded flank clearance and the accompanying thread pitch.

The contact surface 46 extending at an incline in the preinstallation state which formsand forming the head support surface for the screw heads 38 of the set screws 34 is always to be dimensioned such that the contact surface 46 for the respective screw head 38, after locking the screw connection is set at a right angle, at the earliest at the maximum possible threaded flank clearance of the screw connection (compare installation state as shown in FIG. 2). For the embodiments shown, most of the tensioning force generated by the set screws 34 acts near the external spindle thread 18 which is to be clamped so that the efficiency, compared to the disclosedconventional threaded ring designs, is therefore significantly improved. Based on the improved efficiency during clamping and securing of the threaded ring on the spindle 20, the threaded ring as claimed in theof the present invention can be deployed both in the axial and in the radial direction with very small dimensions. Furthermore, the improved efficiency also allows the new threaded ring to be designed with fewer set screws 34.

In the second embodiment as shown in FIGS. 3 and 4, there is in addition theas an additional distinctive feature that, when the screw heads 38 are integrated into the through bores 42 in the installed state, they form a clamping angle b relative to the external end face 44 of the retaining ring 12 which. Clamping angle b corresponds to the angle of inclination a in the preinstallation state, and which allows visual monitoring of the type of locking in this way.. If the respective hexagonal head screw with its screw head 38 is axially integrated in the assignablerespective recess in the

retaining ring 12, the use of socket head cap screws ~~as~~ shown in FIGS. 3 and 4 is recommended, with the possibility of effecting clamping or loosening of the threaded ring by ~~means of~~ suitable tools from the axial longitudinal front side. In the embodiment ~~as~~ shown in FIGS. 1 and 2 conversely ~~as~~, the hexagonal head screw one is preferably used with a screw head 38 ~~which has~~having the hexagon on the outer circumferential side. In this way, it is possible to effect the described clamping and loosening processes from the circumferential side of the threaded ring, that is ~~to say~~, radially.

While various embodiments have been chosen to illustrate the invention, it will be understood by those skilled in the art that various changes and modifications can be made therein without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

THREADED RING

Abstract of the Disclosure

A threaded ring has a single-component body provided with an internal screw thread (14, 16) and two body parts (10, 12). The first part (10) forms an adjusting ring having an end face (22) located on a radial plane. The second body part (12) forms a security ring connected to the first body part (10) by an elastically flexible wall part (32) of the body, forming a gap (26) between the two body parts (10, 12). An actuating device can adjust the geometry of the gap (26) due to the elastic flexibility of the wall element (29) along the longitudinal axis of the body. A bearing surface (46) having a predefinable inclination is arranged in the premounting state between parts of the actuating device and parts of the body. The inclination angle (a) in relation to the longitudinal axis of the body is selected such that in the mounting state, play occurring on the flanks of the screw thread is eliminated, enabling a high degree of efficiency to be obtained based on the force of the actuating device exerted on the inclined bearing surface and the thread flanks which are to be clamped.